

PHARMACEUTICS-I -2111

- 1. Introduction of different dosage forms. Their classification with examples-their relative applications. Familiarization with new drug delivery systems.**
- 2. Introduction to Pharmacopoeias with special reference the Indian Pharmacopoeia.**
- 3. Metrology:** - Systems of weights and measures. Calculation including conversation from one to another system, percentage calculation and adjustment of products. Use of allegation method in calculation, isotonic solutions.
- 4. Packaging of Pharmaceuticals:** - Desirable features of a container- Types of containers, Study of glass and plastics as materials for containers and rubber as a material for closures, their merits & demerits. Introduction to aerosol packaging.
- 5. Size reduction** –Objectives and factors affecting size reduction, methods of size reduction- Study of Hammer mill, Ball mill, Fluid energy mill and disintegrator.
- 6. Size separation-** Size separation by sifting. Official standards for powders. Sedimentation methods of size separe construction and working of cyclone separator.
- 7. Mixing and Homogenization-** Liquid mixing and powder mixing, mixing of semisolids. Study of silver son mixer-Homo geniser. Planetary mixer, Agitated powder mixer: triple roll mill; propeller mixer, colloid mill and hand homogenizer. Double cone mixer.
- 8. Clarification and Filtration-** Theory of filtration, Filter media, filter aids and selection of filters. Study of the following filtration equipments- Filter press, sintered filters, filter candles, Metafilter.
- 9. Extraction and Gelenicals-** (a) Study of percolation and maceration and their modifications, continuous hot extraction- Applications in the preparation of tinctures and extracts. (b) Introduction to Ayurvedic dosage forms.

10. Heat processes- Evaporation- Definition factors affecting evaporation, Study of Evaporating still and Evaporating Pan.

11. Distillation- Simple distillation and Fractional distillation; Steam distillation and vacuum distillation. Study of Vacuum still, preparation of purified water I.P. Construction and working of the still used for the same.

12. Introduction to drying processes- Study of Tray Dryers: Fluidized Bed Dryer, Vacuum Dryer and Freeze Dryer.

13. Sterilization- Concept of sterilization and its difference from disinfection- Thermal resistance of microorganism, Detailed study of the following sterilization processes.

- (i) Sterilization with moist heat,
- (ii) Dry heat Sterilization,
- (iii) Sterilization by radiation,
- (iv) Sterilization filtration and
- (v) Gaseous Sterilization.

Aseptic techniques- Application of sterilization processes in hospitals particularly with reference to surgical dressings and intravenous fluids. Precautions for safe and effective handling sterilization equipment.

14. Processing of Tablets- Definitions; Different types of compressed tablets and their Properties. Processes involved in the production of tablets; tablets excipients; Defects in tablets; Evaluation of tablets; Physical standards including Disintegration and Dissolution. Tablet coating- Sugar coating; film coating, enteric coating and Micro encapsulation (tablet coating may be dealt in an elementary manner).

15. Processing of Capsules- Hard and soft gelatin capsules; different sizes of capsules; filling of capsules; Handling and storage of capsules. Special application of capsules.

16. Study of immunological products like sera, vaccines, toxoids and their preparation.

PHARMACEUTICAL CHEMISTRY-I (2112)

1. General discussion on the following inorganic compounds including important physical and chemical properties, medicinal and Pharmaceutical uses, storage conditions and chemical incompatibility.

(a) Acids, bases and buffers Boric acid, Hydrochloric acid, strong ammonium hydroxide, Calcium hydroxide, Sodium hydroxide and official buffers.

(b) Antioxidants- Hypo phosphorous acid, Sulphur dioxide, Sodium bisulphate, Sodium metabisulphate, Sodium thiosulphate, Nitrogen and Sodium Nitrite.

(c) Gastrointestinal agents-

(i) Acidifying agents, dilute hydrochloric acid.

(ii) Antacids- Sodium bicarbonate, Aluminum hydroxide gel, Aluminum Phosphate, Calcium carbonate, Magnesium carbonate, Magnesium trisilicate, Magnesium oxide, Combinations of antacid preparations.

(iii) Protectives and Adsorbents- Bismuth subcarbonate and Kaolin.

(iv) Saline Cathartics, Sodium Potassium tartrate and Magnesium Sulphate.

(d) **Topical Agents-**

(i) Protectives- Tale, Zinc oxide, Calamine, Zinc stearate, Titanium oxide, Silicone polymers.

(ii) Antimicrobials and Astringents hydrogen peroxide, Potassium permanganate, chlorinated lime, Iodine, Solutions of iodine, Boric acid, Borax silver nitrate, Mild silver protein, Mercury, Yellow mercuric oxide, Ammoniated mercury.

(iii) Sulphur and its compounds- Sublimed sulphur precipitated sulphur, selenium sulphide.

(iv) Astringents- Alum and Zinc Sulphate.

(e) **Dental products** - Sodium Fluoride, Stannous fluoride, Calcium carbonate, Sodium metaphosphate, Dicalcium phosphate, Strontium chloride, Zinc chloride.

(f) **Inhalants-** Oxygen, Carbon dioxide, Nitrous oxide.

(g) **Respiratory stimulants-** Ammonium Carbonate.

(h) **Expectorants and Emetics-** Ammonium chloride, Potassium iodide, Antimony Potassium Tartrate.

(i) **Antidotes-** Sodium nitrite.

2. Major Intra and Extra cellular Electrolytes –

- (a) Electrolytes used for replacement therapy sodium chloride and its preparations, potassium chloride and its preparations.
- (b) Physiological acid- base balance and electrolytes used- Sodium acetate, Potassium acetate, Sodium bicarbonate injection, Sodium citrate, Potassium citrate, Sodium lactate injection, Ammonium chloride and its injection.
- (c) Combination of oral electrolyte powders and solutions.

3. Inorganic official compounds of iron, iodine and calcium ferrous Sulfate and Calcium gluconate.

**4. Radio pharmaceuticals and contrast media- Ratio activity- Alpha, Beta and Gamma radiations, Biological effects of radiations, measurement of radio activity, G. M Counter Radio isotopes- their uses, storage and precautions with special reference to the official preparations.
Radio opaque contrast media- barium sulfate.**

5. Quality control of Drugs and pharmaceuticals methods of quality control, significant errors, methods used for quality control, sources of impurities in pharmaceutical, limit tests for arsenic, ehloride, sulphate, iron and heavy metals.

6. Identification tests for cations and anions as per Indian Pharmacopoeia.

PHARMACOGNOSY -2113

1. Definition, History, Scope of Pharmacognosy including indigenous system of medicine.

2. Various systems of classification of drugs of natural origin

3. Adulteration and drug evaluation: Significance of pharmacopoeial standards.

4. Brief outline of Occurrence, Distribution, Outline of isolation, Identification tests, Therapeutic effects and Pharmaceutical applications of alkaloids, Terpenoids, Glycosides, Volatile oils, Tannins and Resins

5. Occurrence, Distribution, Organoleptic evaluation, chemical constituents including tests where applicable and Therapeutic efficacy of following categories of drugs.

(a) Laxatives: Aloes, Rhuburb, Castor oil, Is-paghula, Senna

(b) Cardio tonics- Digitalis, Arjuna.

(c) Carminative & G.I regulators- Umbelliferous fruits, Coriander, Fennel, Ajowan, Cardamom Ginger, Black pepper, Asafoetida, Nutmeg, Cinnamon, Clove.

(d) Astringents-Catechu.

(e) Drugs acting on nervous system: Hyoseyamus, Belladonna, Aconite, Ashwagandha, Ephedra, opium, Cannabis, Nux vomica.

(f) Antihypertensive- Rauwolfia.

(g) Antitussives- Vasaka, Tolu balsam, tulsi.

(h) Antirheumatics- Guggul, Colchicum.

(i) Antitumour-Venca.

(j) Antileprotics- Chaulmoogra oil.

(k) Antidiabetics- pterocarpus, Gymnema, Sylvestro.

(l) Diuretics- Gokhru, Punarnva.

(m) Antidysentrics- Ipecacuanha.

(n) Antiseptics and disinfectants Benzoin, Myrrh Nim, Curcuma.

(o) Antimalarials- Cinchona.

(p) Oxytocics- Ergot.

(q) Vitamins- Shark liver Oil and Amla.

(r) Enzymes- Papaya, Diastase, Yeast.

(s) Perfumes and Flavouring agents- Peppermint oil, Lemon oil, Orange oil, Lemon grass oil, Sandalwood.

(t) Pharmaceutical aids- Honey, A rachis oil, Starch, Kaolin, Pectin, Olive Oil, Lanolin, Bee wax, Acacia, Tragacanth, Sodium alginate, Agar, Guar gum, Gelatin.

(u) Miscellaneous- Liquor ice, Garlic, Picrohiz, Dioscorea, Linseed, Shatavari, Shankpushpi, Pyrethrum, Tobacco.

6. Collection and Preparation of crude drug for the market as exemplified by Ergot, Opium, Rauwolfia, Digitalis, Senna.

7. Study of source, preparation and identification of fibers used in sutures and surgical dressing- Cotton, silk, wool and regenerated fiber.

8. Gross anatomical studies for Senna, Datura, Cinnamon, Cinchona, Fennel, Clove, Ginger, nux Vomica & Ipecacuanha.

BIOCHEMISTRY AND CLINICAL PATHOLOGY -2114

- 1 Introduction to Biochemistry.
- 2 Brief chemistry and role of proteins, polypeptides and amino acids, classification, qualitative tests biological value. Deficiency diseases.
- 3 Brief chemistry and role of carbohydrates, classification, qualitative tests. Diseases related to carbohydrate metabolism.
- 4 Brief chemistry and role of lipids, classification, qualitative tests. Disease related to lipids metabolism.
- 5 Brief chemistry and role of vitamins and coenzymes.
- 6 Role of minerals and water in life processes.
- 7 Enzymes: Brief concept of enzymic action. Factors affecting it. Therapeutic and pharmaceutical importance.
- 8 Brief concept of normal and abnormal metabolism of proteins, carbohydrates and lipids.
- 9 Introductions to pathology of blood and urine.
 - (a) Lymphocytes and platelets, their role in health and disease.
 - (b) Erythrocytes abnormal cells and their significances.
 - (c) Abnormal constituents of urine and their significances in diseases.

Human Anatomy Physiology Theory (2115)

1. **Scope of Anatomy & Physiology, Definitions of Various Terms used in Anatomy-** Study of Human Anatomy & Human Physiology, Definitions of Metabolism, Morphology, Historlogy, Taxonomy, Ecology, Pathology & cytology.
2. **Structure of Cell, Functions of its components with special reference to Mito Chondria & Microcosms-** Structure of Prokaryotic & Eukaryotic Cell, Structure of Plasma Membrane, Cytoplasm, Neucleus, Ribosoms, Microsoms, Golgi Bodies, Central Appratus, Plaslids, DNA+Chemical Nature of Protoplasm.
3. **Elementary Tissues of Body i.e. Epithelial, Tissue, Musclar Tissues, Connective Tissue & Nervous Tissues-** Tissues, Classification, Kinds of Epithelial Tissues e.g. Simple. Complex, Sqnamous, cubordal, Columanar, Ciliated Psendo Stratified, Startrfied and Transitional epithelial. Muscular Tissues-Striped, Unstriped, Careheic Tissues. Connective Tissues-Connective Tissues Proper, i.e. Areolar, Adipose, White Fibrous Tissues, Yellow Fibers, Reticular Skeletal Tissues e.g. bone & Cartilaze. Vascular Tissues-e.g. bone & lymph. Nervous Tissues-e.g. Nervous, Unipolar, pipolar, Multipolar. Nerve Fibre- Medullated & Non Maculated, N.fibres.
4. **Structure & Function of Skelton ,Classification of joints and Their Function joints and their function Joint disorders-:** Functions of Skelton, Axial Skelton , Appendicular Skelton, Axial skelton, skull, Vertebral Column .Thoracic case lower limb, Joints of the Skelton, Fixed Joints synovial joints, disorders of joints.
5. **Composition of Blood, Function of blood elements-blood groups and co- Angulations of blood. Brief information regarding disorders of blood -**
Composition of blood e.g. blood plasma, blood corpuscles, Red Coppuscies, White and pallets, mechanism of clotting of blood, Anteger & antibody various blood groups i.e. A, B, AB+, o, RH factor, +ve, -ve, Disorders wee, Harmophilia Thrmobocytopenia, thrombosis.
6. **Nature and functions of lymph glands-:** lymph is structure, structure & functions of Lymph glands
7. **Structure and functions of various parts of Heart Arterial and various system with special reference to the names and position of main arteries and veins .**

Blood Pressure and its recording .Brief information about cardiovascular Disorders-

: External and internal structure of Human Heart .Detailed study of int. structure of Auricles &ventricle blood through the chambess of heart. Arterial system, detailed study of origin of main arteries from aorta e.g. canolodes, sub-clarians, descending aorta &various branches arising from it.

Venous system: main veins bringing various blood from anterior parts e.g. junglar, Sub clavians&forming superior venacana.main veins bringing venous blood from Posterior/lower parts and form inferior venacana Blood pressure, systoloc and diastolic its measurement with the help of syphymo-mantometer.Disorder e.g. Hypertension, Arterio sclerosis, CCF, Angina pectoris, myocardial infraction.

8. Various Parts of Respiratory system and their functions physiology of Respiration-: parts of respiratory system e.g. nostrils, lawman, naro pharynx, trachera, broncos +lunps.respiratory muscles, mechanism of respiration.

9.Various Parts of urinary systems and their functions,structure &function of kidney physiology of urine formation .patho-physiology of renal elisesses and Axdena-:Excretory organs ,structure of kidneys &nephrones,physiology of excretion i.e. filtration ,re-absorpilan and tubular secretion.composition of pylonepherrius ,glomernlonepheribis,slone formation uremia.skin, structure and functions of skin.

10. Structure of Skeletal Muscle, Physiology of Muscle Contraction, Names, Positions, Attachments & Functions of various Skeletal Muscles Physiology of Neuro muscular function- Myology: Imp. Muscles of the body, Physiology of Muscle Muscular Function, Generation of action potential at Nerve Terminal & releas Contraction, Euro- e of Acetylcholine Relaxation of muscle. Muscle Fatigue, Muscle Tane.

11. Various Parts of Central Nervous System, Brain & its Parts, Functions & Reflex Action. Anatomy & physiology of Autonomic Nervous System-Brain & Spinal Cord: Structure & functions of various parts of Brain, Structure & functions of various parts of Spinal Cord, Reflex Action. Autonomic N.S, Sympathetic & Parasympathetic N.S

12.Elementary knowledge of structure & functions of the organs of taste, smell, ear, eye & skin physiology of pain- Structure & functions of tongue, taste bud, Structure of nasal,Panage & neuro-sensory cells. Structure of Human eye, Mechanism of image Formation, Defects of eye. Structure of human ear, mechanism of gearing. Structure of skin, functions of skin in detail &Physiology of pain.

13. Digestive System, Names of various parts of Digestive system & their Functions, structure & functions of Liver, Physiology of Digestion & absorption- Digestion, Digestive System: Organs, Parts of G.I Tract, Structure of each Part & its Functions, Mechanism of Digestion of Food in mouth cavity, Stomach, Duodenum & small intestine.
Absorption of food in small intestine, Absorption of H₂O in large intestine, Structure of liver & detailed Study of functions of Liver.

14. Endocrine Glands & Hormones, Location of Glands, Their Hormones & functions, Pituitary, Thyroid, Adrenal, Pancreas- Gland, Endocrine glands: Location, Structure of pituitary gland, Detailed study of Hormones Secreted by Various Lobes of Pituitary gland.
Structure of Thyroid, glands & functions of Hormones Secreted by Thyroid. Disorder of Thyroid i.e. Hyperthyroidism & Hypothyroidism.
Structure of Adrenal glands & functions of Hormones Secreted by Cortex of adrenal gland & hormones Secreted by Medulla of Adrenal gland.
Structure of Pancreas, Secretions, Secreted by Pancreas, helpful in Digestion. Hormones secreted by pancreas, Disorders of Pancreas.

15. Reproductive System, Physiology and Anatomy of Reproductive System- Study of Reproductive Organs of Male, Study of Reproductive Organs of Female, Structure of a Male gamete & Female gamete.

HEALTH EDUCATION & COMMUNITY PHARMACY (2116)

- 1. Concept of Health-**Definition of Physical health, Mental, Social, Spiritual health. Determinants of health, Indicators of health. Concept of Diseases, The diseases agents. Concepts and prevention of diseases-Variou definitions of health and the terms used in relation to health.Hygiene,Preventive and social medicine, community health & health for all. Various components of health are: Physical health, mental health, Characteristics of Mentally healthy Person, Signal of mentally ill person, Signal of mentally ill person and Ways to improve mental health. Social health, Spiritual health, Determinants/factors of health like Heredity life style, Socio-economic factors, political will, Available of health services.

Indications of health: Mortality rate, morbidity rate, health care services indicators

Concept of disease: Various theories about the causes of diseases.

Diseases agents: Biological, physical, chemical, mechanical & nutritional. Prevention of diseases, health education, aims& objective of health education.

- 2. Nutrition & Health-** Food, classification of food:
 - Carbohydrates: Sources, functions & deficiency diseases
 - Proteins: Sources, functions & deficiency diseases.
 - Fats: Sources, functions & deficiency diseases.
 - Minerals Salts: Main minerals sources, functions & deficiency diseases.
 - Vitamins: Fat soluble & H₂O soluble vitamins, their sources, functions & deficiency diseases. H₂O sources & functions, roughage sources & functions.
- 3. Demography & Family Planning, Demography Cycle,Fertility,Family Planning Contraceptive Methods, Behavioral Methods, Natural Family Planning Methods, Chemical Methods, Hormonal Contraceptives, Population Problem of India-** Definition of demography and demography cycle, various stages of demography cycle. Fertility and factors on which fertility depends.
 - Family Planning-Need of family planning, Methods of family planning,temporary methods & permanent methods, advantages & disadvantages of various natural family planning method e.g. sexual obstinence, coitus interruptus rhythm method, basal baby temp. method, cervical musuc method, protonged lactation method.
 - Mechanical Method: Condom, diaphragm, their advantages & disadvantages.
 - Intra-Uterine Devices: Lippies loop, copper-t.

Chemical Methods: Foam tablets, contractive creams & jellies pessaries, oral pills.

Permanent Methods: Vasectomy tubectomy, laparoscopy medical termination of pregnancy.

4. First Aid-Emergency Treatment in Shock, Snake-bite, Burns, Poisoning, Heart diseases, Fractures and Resuscitation Methods, Elements of Minor Surgery & Dressings- Definition of first aid and principles of first aid, types of first aid which can be given in accidents. accidental poisoning, seasonal accidents, abrasions cuts, choking.

First Aid in Shocks, Snake bite burns and scalds electric shock.

First Aid in Poisoning, first aid in angina, heart attack, haemorrhage.

First Aid in Fractures, cardio- pulmonary resuscitation method.

Elements of minor surgery and dressings.

5. Environment & Health, Sources of Water Supply, Pollution, purification of H₂O, Health & Air, Noise light solid waste disposal & Control medical entomology, Arthropod borne disease & their control, rodents animal diseases- Various components of ext. environment are physical, chemical, Biological & social health.

Sources of Water e.g. rain, surface H₂O, rivers, wells tanks & ponds, ground H₂O, sanitary wells springs, impurities in H₂O, H₂O pollution water borne diseases,

Purification of H₂O: Various methods of purification of H₂O on large scales, small scale purification of H₂O.

Hardness of H₂O: Disadvantages of H₂O.

Air composition, air pollution, air borne diseases, prevention & control of air pollution, noise, effects of noise pollution & its control.

Solid waste disposal & control, storage and collection of refuse and disposal of refuse by different methods like dumping controlled tipping, burial, composting burning, excreta disposal, various arthropod borne diseases & control of arthropods, control of arthropods, control of rodents and other animal diseases.

6. Fundamental Principle of Microbiology, Classification of Microbes, Isolation, Staining techniques of organism of common disease –

Microbiology: Definition, classification, pathogenic microbes, bacteria, algae, fungi moulds, yeasts rickettsias, mycoplasmas, protozoa virus, Bacteria: classification, structure in detail. Virus: structure, types. Algae: structure economic importance.

Fungi: Moulds & yeast, structure, pathogenic effects of fungi.

Rickettsias: Structure & pathogenic effects.

Micro plasmas: Structure & pathogenic effects.

Protozoa: Structure & pathogenic effects.

Isolation of Micro-organisms: Isolation techniques, pure culture, mixed culture.

Pour plate technique, colonies on agar media, agar slants, in nutrient broth.

Staining of Micro-organisms- Different staining techniques, simple staining, different staining, gram's staining method, acid fast staining techniques, Ziehl, Neelsen method, staining of spores, staining of capsules.

7. Communicable diseases, Causative agents, Modes of Transmission and Prevention-

(a) Respiratory Infections- Chicken Pox, Measles, Influenza Diphtheria, Whooping Cough and Tuberculosis – Common cold: causative agent, incubation period, symptoms and preventive measure.

Influenza: Causative agent, incubation period, symptoms and preventive measures.

Measles: Causative agent, incubation period, symptoms and preventive measures.

Whooping Cough: Causative agent, incubation period, symptoms and preventive measure.

Tuberculosis: Causative agent, incubation period, symptoms and preventive measure.

(b) Intestinal Infections- Poliomyelitis, Hepatitis, Cholera typhoid, Food Poisoning, Hookworm Infection :-

Poliomyelitis: Causative agent, incubation period, symptoms and preventive measure.

Hepatitis: Types, Causative agent, incubation period, symptoms and preventive measure.

Cholera: Causative agent, incubation period, symptoms and preventive measures.

Thyroid: Causative agent, incubation period, symptoms and preventive measures.

Food Poisoning: Types of food poisoning, Causative agent, incubation period, symptoms and preventive measures.

Hookworm Infection: Causative agent, incubation period, symptoms and preventive measures.

(c) Arthropod Borne Infections- Plague, Malaria, Filariasis:-

Plague: Types of plague, Causative agent, incubation period, symptoms and preventive measures.

Malaria: Causative agent, incubation period, symptoms and preventive measures.

Filariasis: Causative agent, incubation period, symptoms and preventive measures.

(d) Surface Infections- Rabies, Trachoma, Tetanus, Leprosy:-

Rabies: Causative agent, incubation period, symptoms and preventive measures.

Trachoma: Causative agent, incubation period, symptoms and preventive measures.

Tetanus: Causative agent, incubation period, symptoms and preventive measures.

Leprosy: Causative agent, incubation period, symptoms and preventive measures.

(e) Sexually Transmitted Diseases- Syphilis, Gonorrhoea, and AIDS:-

Syphilis: Causative agent, incubation period, symptoms and preventive measures.

Gonorrhoea: Causative agent, incubation period, symptoms and preventive measures.

AIDS: Causative agent, incubation period, symptoms and preventive measures.

8. Non- communicable Diseases- Cancer, Diabetes, Blindness, Cardiovascular Diseases:-

Cancer: Causative agent, incubation period, symptoms and preventive measures.

Diabetes: Causative agent, incubation period, symptoms and preventive measures.

Blindness: Causative agent, incubation period, symptoms and preventive measures.

Cardio- vascular Diseases:-

Hypertension: Causative agent, incubation period, symptoms and preventive measures.

Rheumatic Heart Diseases: Causative agent, incubation period, symptoms and preventive measures.

Coronary Heart Diseases: Causative agent, incubation period, symptoms and preventive measures.

Congestive Cardiac Failure: Causative agent, incubation period, symptoms and preventive measures.

9. Epidemiology- Its scope, methods, uses, dynamic of diseases transmission, immunity and immunisation, immunological products and their dose schedule, principle of diseases, control and prevention, hospital acquired infections, prevention & control, disinfection, types of disinfection, disinfection procedures for faeces. Urinal, sputum room, linen, dead bodies & instruments:-

Epidemiology & use of Epidemiology, factors responsible for the spread of the diseases i.e. agent, host, environment, common terms used in epidemiology.

Modes of transmission of infection i.e. direct & indirect transmission of diseases, general methods of prevention and control of communicable diseases.

Immunity: Types of immunity, natural immunity, acquired immunity, active immunity, passive immunity, naturally acquired passive immunity, artificial produced passive immunity and immunological preparations.

Hospital Acquired Infections: Their prevention & control.

Disinfections & disinfectants:

Classification of disinfectants: Physical, chemical, natural disinfectants, disinfection procedure for faeces, urine, sputum room, dead bodies and instruments.

PHARMACEUTICS-II(2131)

1. Dispensing Pharmacy:

- (i) **Prescriptions-** Reading and understanding of prescriptions; Latin terms commonly used, Modern methods of prescribing, adoption of metric system. Calculations involved in dispensing.
- (ii) **Incompatibilities in prescription-** Study of various types of incompatibilities- physical, chemical and therapeutic.
- (iii) **Posology-** Dose and dosage of drugs. Factors influencing dose. Calculation of doses on the basis of age, sex, and surface area. Veterinary doses.

2. Dispensed Medication:

- (i) **Powders-** Types of powders, advantages and disadvantages of powders, Granules, Cachets and Tablet triturates. Preparation of different types of powders encountered in prescription. Weighing methods, possible errors on weighing, minimum weighable amounts and weighing of a material below the minimum weighable amount, geometric dilution and proper usage and care of dispensing balance.
- (ii) **Liquid Oral Dosage Forms:**
 - (a) **Monophasic-** Theoretical aspects including commonly used vehicles, essential adjuvant like stabilizers, colourants and flavours, with examples. Review of the following monophasic liquids with details of formulation and practical methods.
 - (b) **Biphasic Liquid Dosage Forms:**
 - (i) **Suspensions-** Suspensions containing diffusible solids and liquids and their preparations. Study of the adjuvants used like thickening agents, wetting agents, their necessity and quantity to be incorporated. Suspensions of precipitate forming liquids like tinctures, their preparations and stability. Suspensions produced by chemical relation. An introduction to flocculated/ non-flocculated suspensions systems.
 - (ii) **Emulsions-** types of emulsions, identification of emulsions system, formulation of emulsions, selection of emulsifying agents. Instabilities in emulsions, preservation of emulsions.

(iii) Semi- Solid Dosage Forms:

(a) Ointments- Types of ointments, classification and selection of dermatological vehicles. Preparation and stability of ointments by followings processes: (i) Trituration (ii) Fusion (iii) Chemical Reaction (iv) Emulsification.

(b) Pastes- Differences between ointments and pastes. Bases of pastes. Preparation of pastes and their preservation.

(c) Jellies- An introduction of the different types of jellies and their preparation.

(d) Poultices- An elementary study of poultice.

(e) Suppositories and pessaries- Their relative merits and demerits, types of suppositories, suppository bases, classification properties, preparation and packing of suppositories. Use of suppositories for drug absorption.

(iv) Dental and Cosmetic Preparations: Introduction to Dentrifices, Facial cosmetics, Deodorants, Antiperspirants, Shampoos, Hair dressings and Hair removers.

(v) Sterile Dosage Forms :

(a) Parenteral dosage forms- Definition, general requirements for parenteral dosage forms. Types of parenteral formulations, vehicles, adjuvants, processing, personnel, facilities and quality control. Preparation of intravenous fluids and admixtures- Total Parenteral nutrition, dialysis fluids.

(b) Sterility testing, particular matter monitoring, faulty seal packaging.

(c) Ophthalmic Products- Study of essential characteristics of different ophthalmic preparation. Formulation additives, special precautions in handling and storage of ophthalmic products.

PHARMACEUTICAL CHEMISTRY-II (2132)

1. **Introduction to the nomenclature of organic chemical systems with particular reference to heterocyclic system containing up to 3 rings.**
2. **The chemistry of following Pharmaceutical organic compounds, covering their nomenclature, chemical structure, uses and important physical and chemical properties (Chemical structure of only those compounds marked with asterisk (*)).
The stability and storage conditions and the different type of pharmaceutical formulations of these drugs and their popular brand names.**
3. **Antiseptics and Disinfectants** – Proflawine, Benzal-koniumchloride, Cetrimide, Chlorocresol*, Chloroxylyene, Formaldehyde solution, Hexachlorophene liquefied phenol, Nitrofurantoin.

Sulfonamides- Sulfadiazine, Sulfa guanidine, Phthaysulfathiazole, Sulfamethoxyipyridazine, Sulfamethoxazole, co- trimoxazole, Sulfacetamide.

Antiteprotic Drugs- Clofazimine, Thaimbatosine, Dapsone, Solapson.

Anti-tubercular Drugs- Isoniazid, PAS, Streptomycin, Rifampicin, Ethambutal, Thiacctazone, Ethionamide, Cycloscrine, Pyrazinamide.

Antiamoebic and Anthelmintic Drugs- Emetine, Metronidazole, Halogenated Hydroxyquinolines, Diloxanidefuroate, Paramomycin Piper zinc, Mebendazole, D.E.C.

Antibiotics- Benzyl Penicillin, Phenoxy Methyl, Penciline, Benzathine Penicillin, Ampicilin, Cloxacillin, Carbenicillin, Gentamicin, Neomycin, Erythromycin, Tetracycline, Cepahalexin, Cephaaloridine, Cephalothin, Griseofulvine, Chloramphenicol.

Antifungal agents- Undeeylenic acid, Tolnaftate, Nystain, Amphotericin, Hamyein.

Antimalarial Drugs- Chloroquine*, Amodiaquine, Primaquine, Proguanil, Pyrimethamine*, Quinine, Trimethoprim.

Tranquilizers- Chlorpromazine*, Prochlorperazine, Trifluoperazine, Haloperidol, Tripe idol, Oxypertine, Chlordiazepoxide, Diazepam*, lorazepam, Merprobamate.

Hypnotics- Phenobarbitone*, Butobarbitone, Cyclobarbitone, Nitrazepam, Glutethimide*, Methyptylone, Paraldehyde, Triclofos Sodium.

General Anaesthetics- Halothane* Cyclopropane*, Diethyl ether*, Methohexital sodium, Thiopental sodium, Trichloroethylene.

Antidepressant Drugs- Amitriptyline, Nortriptyline, Imipramine*, Phenelzine, Tranylepromine.

Analeptics- Theophylline, Caffeine*, Coramine* Dextroamphetamine.

Adrenergic Drugs- Adrenaline*, Nor adrenaline, Isoprenaline*, Phenylephrine, Salbutamol, Terbutaline, Ephedrine*, Pseudo ephedrine

Adrenergic Antagonist- Tolazoline, Propranolol, Practolol.

Cholinergic Drugs- Neostigmine*, Pyridostigmine, pralidoxime, Pilocarpine, Physostigmine.

Cholinergic Antagonists- Atropine, Hyoscine, Homatropine, Propantheline, Benztropine, Tropic amide, Biperden.

Diuretic Drugs- Furosemide*, Chlorothiazide, Hydrochlorothiazide*, Benzthiazide, Urea*, mannitol, Ethacrynic Acid.

Cardiovascular Drugs- Ethyl nitrite, Glyceryl trinitrate, Alpha methyl dopa, Guanethidine, Clofibrate, Quinidine.

Hypoglycemic Agents- Insulin, Chlorpropamide*, Tolbutamide, Glibenclamide, Phenformin*, Metformin.

Coagulants and Anti Coagulants- Heparin, Thrombin, Menadione, Bishydroxycoumarin, Warfarin Sodium.

Local Anesthetics- Lignocaine, Procaine, Benzocaine.

Histamine and Anti Histaminic Agents- Histamine, Diphenhydramine,

Promethazine, Cyproheptadine, Mepyramine, Pheniramine,
Chlorpheniramine.

Analgesics and Anti- Pyretics- Morphine, Pethidine, Codeine,
Methadone, Aspirin, Paracetamol, Analgin, Dextropropoxyphene, Pentazocine.

Non- Steroidal anti- inflammatory Agents- Indomethacin,
Phenylbutazone, Oxyphen butazone, Ibuprofen.

Thyroxin and Antithyroids- Thyroxine, Methimazole, Methylthiouracil,
Propylthiouracil.

Diagnostic Agents- Iopanoic Acid, Propylidone, Sulfobromophen Sodium,
Indigotindisulfonate Sodium (Indigo Carmine), Evans Blue, Congo Red,
Fluorescein Sodium.

**Anticonvulsants, Cardiac, glycosides, Antiarrhythmic, antihypertensive &
vitamins.**

Steroidal Drugs- Betamethazone, Cortisone, Hydrocortisone, prednisolone,
Progesterone, oestradiol Nandrolone.

Anti- Neoplastic Drugs- Actinomycins, Azathioprine, Busulphan,
Chlorambucil Cisplatin cyclophosphamide, Daunorubicin, Hydrochloride,
Fluorouracil, Mercaptopurine, Methothrexate, Mytomycin.

PHARMACOLOGY & TOXICOLOGY -2133

- 1. Introduction to Pharmacology, scope of Pharmacology.**
- 2. Routes of administration of drugs, their advantages and disadvantages.**
- 3. Various processes of absorption of drugs and the factors affecting them, Metabolism, Distribution and excretion of drugs.**
- 4. General mechanism of drugs action and the factors which modify drug action.**
- 5. Pharmacological classification of drugs. The discussion of drugs should emphasis the following aspect:-**
 - (i) Drugs acting on the Central Nervous System:-
 - (a) General Anaesthetics, adjuncts to anesthesia, intravenous Anaesthetics.
 - (b) Analgesic antipyretics and non-steroidal, anti-inflammatory drugs, Narcotic analgesics, Ant rheumatic and antigout remedies, Sedatives and Hypnotics, Psychopharmacological agents, anti convulsants, analeptics.
 - (c) Centrally acting muscle relaxants and Anti- Parkinsonism agents.
 - (ii) Local Anesthetics.
 - (iii) Drug acting on autonomic nervous system.
 - (a) Cholinergic drug, Anti- Cholinergic drugs, anti- cholinesterase drugs.
 - (b) Adrenergic drugs and adrenergic receptor blockers.
 - (c) Neurone blockers and ganglion blockers.
 - (d) Neuromuscular blockers, drugs used in myasthenia gravis.
 - (iv) Drugs acting on eye, mydriatics, drugs used in glaucoma.
 - (v) Drugs acting on respiratory system-Respiratory stimulants, Bronchodilators, Nasal decongestants, Expectorants and Antitussive agents.
 - (vi) Antacids, Physiological role of histamine and serotonin, Histamine and Antihistamines, Prostaglandins.

- (vii) Cardio Vascular drugs, cardio tonics, Ant arrhythmic agents, antianginal agents, Antihypertensive agents, peripheral vasodilators and drugs used in atherosclerosis.
- (viii) Drugs acting on the blood and blood forming organs. Haematinics, Coagulants and anti-coagulants, Haemostatic, Blood substitutes and expanders.
- (ix) Drugs affecting renal function-Diuretics and ant diuretics.
- (x) Hormones and hormone antagonists-hypog-ly ycemic agents, Antithyroid drugs, sex hormones and oral contraceptive, corticosteroids.
- (xi) Drugs acting on digestive system-car-minatives, digest ants Bitters, Antacids and drugs used in peptic ulcer, purgative, and laxatives, Ant-diarrhoeals, Emetics, Anti-emetics, Anti-spasmodic.

6. Chemotherapy of microbial disease: Urinary Anti-septic, Sulphonamides, Penicillin, Streptomycin. Tetracylines and other antibiotics, Antiubercular agents. Antifungal agents, antiviral drugs, Antiubercular drugs.

7. Chemotherapy of protozoal diseases, Anthelmintic drugs.

8. Chemotherapy of cancer.

9. Disinfectants and Anti-septic.

10. A detailed study of the action of drugs of each organ is not necessary.

PHARMACEUTICAL JURISPRUDENCE -2134

- 1. Origin and nature of Pharmaceutical Legislation in India. Its scope and objectives. Evaluation of the “Concept of Pharmacy” as an integral part of the Health Care System.**
- 2. Principles and significance of Professional Ethics. Critical study of the code of Pharmaceutical Ethics drafted by Pharmacy Council in India.**
- 3. Pharmacy Act, 1948-** The General study of the Pharmacy Act with special reference to Education Regulations. Working of State and Central Councils. Constitutions of these councils and functions. Registration procedures under the Act.
- 4. The Drugs and Cosmetics Act 1940-** General study of the Drugs and Cosmetics Act and the rules there under. Definitions and salient features related to retail and wholesale distribution of drugs. The powers of inspectors, the sampling procedures and the procedure and formalities in obtaining licenses under the rule. Facilities to be provided for running a pharmacy effectively. General study of the schedules C, C₁, F, G, J, H, P & X and salient features of labeling and storage condition of drugs.
- 5. The Drugs and magic Remedies (Objectionable Advertisement) Act, 1954-** General study of the Act Objectives, special reference to be laid on Advertisements. Magic Remedies and Objectionable and permitted advertisements- diseases which cannot be claimed to be cured.
- 6. Narcotic Drugs and Psychotropic Substances Act, 1985-** A brief study of the act with special reference to its objectives, offences and punishment.
- 7. Brief introduction to the study of the following acts:**
 - (i) Latest Drugs (price control) Order in force
 - (ii) Poison Act, 1919 (as amended to date)
 - (iii) Medical and Toilet Preparation (Excise Duties) Act, 1955 (as amended to date)
 - (iv) Medical Termination of Pregnancy Act, 1971 (as amended to date)

DRUG STORE AND BUSINESS MANAGEMENT- 2135

1. **Introduction** – Trade, Industry and commerce Functions and Subdivision of Commerce, Introduction to Elements of Economics and Management.
2. **Forms of Business Organization.**
3. **Channels of Distribution.**
4. **Drug House Management- Selection of site, Space Layout and legal requirements. Importance and objectives of purchasing, selection of suppliers, credit information, tenders, contracts and price determination and legal requirements thereto. Codification, handling of drug stores and other hospital supplies.**
5. **Inventory Control-** Objects and importance, modern techniques like ABC, VED analysis, the lead-time, Inventory carrying cost, safety stock, minimum and maximum stock levels, economic order quantity scrap and surplus disposal.
6. **Sales Promotion, Market Research, Salesmanship, Qualities of a salesman, Advertising and Window Display.**
7. **Recruitment, training, evaluation and compensation of the pharmacist.**
8. **Banking and Finance Service and Functions of Bank, Finance Planning and sources of finance part-II Accountancy.**
 - (a) Introduction to the accounting concepts and conventions, Double entry Book keeping, Different types of accounts.
 - (b) Cash Book.
 - (c) General Ledger and Trial Balance.
 - (d) Profit & Loss Account and Balance Sheet.
 - (e) Simple technique of analyzing financial statements.

HOSPITAL AND CLINICAL PHARMACY-2136

PART – I : HOSPITAL PHARMACY :

1. **Hospitals-** Definitions, Function, Classification based on various criteria, organization, Management and health delivery system in India.
2. **Hospital Pharmacy-**
 - (a) Definition
 - (b) Functions and objectives of Hospital Pharmaceutical Services.
 - (c) Location, Layout, flow chart of material and men.
 - (d) Personnel and facilities requirements including equipments based on individual and basic needs.
 - (e) Requirements and abilities required for Hospital Pharmacists.
3. **Drug Distribution system in Hospitals-**
 - (a) Out- patient services.
 - (b) In-patient services:- (i) types of services (ii) detailed discussion of unit dose system, floor ward stock system, Satellite pharmacy services, central sterile services, bed side pharmacy.
4. **Manufacturing-**
 - (a) Economical considerations, estimation of demand.
 - (b) Sterile manufacture- Large and small volume parented facilities, requirements, layout, production planning, and man- power requirements.
 - (c) Non-sterile manufacture- Liquid orals, externals, Bulk concentrate.
 - (d) Procurement of stores and testing of raw material.
5. **Nomenclature and uses of surgical instruments and hospital requirements and health accessories.**
6. **P.T.C (Pharmacy Therapeutic Committee), Hospital formulary system and their organization, functioning, composition.**
7. **Drug information service and Drug Information Bulletin.**
8. **Surgical dressing like cotton, gauze, bandages adhesive tapes including their pharmacopoeia tests for quality. Other hospital supply e.g. I. V sets, Ryals tubes, Catheters, syringes etc.**
9. **Application of computer in maintenance of records, inventory control, medication monitoring, drug information and data storage and retrieval in hospital and retail pharmacy establishments.**

PART-II: CLINICAL PHARMACY

- 1. Introduction to Clinical Pharmacy Practice-** Definition & scope.
- 2. Modern dispensing aspects-** Pharmacists and patient counseling and advice for the use of common drugs, medication history.
- 3. Common daily terminology used in the practice of medicine.**
- 4. Disease, manifestations and path physiology including salient symptoms to understand the diseases like Tuberculosis, Hepatitis, Rheumatoid Arthritis, Cardio-vascular diseases, Epilepsy, Diabetes, Peptic ulcer , Hypertension.**
- 5. Physiological parameters with their significance.**
- 6. Drug Interactions:**
 - (a) Definition and Introduction.
 - (b) Mechanism of drug interaction.
 - (c) Drug- Drug interaction with reference to analgesics, diuretics, cardio vascular drugs, gastro-intestinal agents vitamins and hypoglycemic agents.
 - (d) Drug- food interaction.
- 7. Adverse Drug Reaction:**
 - (a) Definition & Significance
 - (b) Drug- Induces diseases and Teratogenicity.
- 8. Drug in Clinical Toxicity** – Introduction, general treatment of poisoning, systematic antidouse, treatment of insecticide poisoning, heavy metal poison, Narcotic drugs, Barbiturate, organ phosphorus poisons.
- 9. Drug dependences, Drug abuse, Addictive drugs and their treatments, complications.**
- 10. Bio-availability of drugs, including factors affecting it.**